Changing Attitudes and Actions - Livestock Medicines Courses in Ontario

Author: N. Anderson - Senior Veterinary Scientist, Cattle/OMAF; T. Blackwell - Veterinary Specialist, Swine/OMAF; L. Bassel; P. Innes - Veterinary Scientist Epidemiology/OMAF; D. Alves - Provincial Veterinarian/OMAF

Creation Date: Not Available
Last Reviewed: 08 July 2003

Table of Contents

1. Introduction
2. Livestock medicines courses 1993-1996
3. Swine medicines courses 1998-1999
4. Swine medicines audit 1999
5. Livestock Medicines Certification Committee - towards 2003
6. Discussion and conclusions
7. References

Introduction

Like most agricultural regions of North America, Ontario has four distinct seasons - planting, growing, harvesting, and meeting. During meeting season, Ontario farmers choose from a plethora of continuing education events.

In a typical season, for example, producers either ask for or are offered courses about growing corn, ventilating barns, estate planning, financial management or trimming feet. In 1992 producers identified a need and asked for more information about livestock medicines.

The use of livestock medicines continues to be of real interest to our producers. As in other countries, farmers are adopting stricter drug handling practices to improve opportunities for market access and international trade, human health and safety, animal health and welfare, and residue avoidance. More recently, the handlers of livestock medicines have become increasingly aware of how their actions affect antimicrobial resistance management on livestock farms.

Our producers want useful information about medicines to apply to their farming operation. Courses or workshops that provide appropriate information through proven techniques in adult education can influence activity at the farm level. This paper describes our experience with livestock medicines courses in Ontario.

| Top of Page |

Livestock medicines courses 1993-1996

During the 1993-1996 meeting seasons, OMAF veterinarians and animal care staff, and private veterinary practitioners taught livestock medicines courses to nearly 2000 livestock producers. The Ontario Livestock Medicines Education Program teaching format was primarily participative workshops using case studies to meet learning objectives. Although the majority of one-day courses were species specific for ruminants (dairy, beef, veal), facilitators delivered several general courses dealing with all ruminant

species. Often owners of horses, pigs and alternative livestock attended these general workshops. Participants received a 320-page Livestock Medicines Manual as part of their course registration package.

The standard agenda for each course included:

- a pre-course survey, introductions, expectations, and objectives
- residues and responsibilities
- calculating drug dosage and withholding time
- extra-label drug use
- injection guidelines
- reading the label, human and animal risks
- reasons for therapeutic failure
- identifying treated animals and keeping records
- vaccines
- purchase, storage, transport, disposal, and
- a post-course survey and evaluation.

The objectives were to enable handlers of livestock medicines to:

- protect the quality of medicines
- use medicines with due regard for the safety of humans and animals, and to
- prevent residues in food.

At the time, antimicrobial resistance management on farms was neither a specific agenda item nor the focus of the teaching. Nonetheless, several agenda items briefly touched on the subject. Furthermore, neither the manual nor the workshops described disease conditions of livestock or the various treatments for the conditions. However, participants often suggested a need for workshops that included diagnosis and treatment.

Pre- and post-course surveys measured producers' changes in knowledge, opinion or attitudes about use and handling of medicines (Alves, D and McEwen, S). Participants cited concerns about residues in food and safety in handling livestock medicines as the main reasons for attending the voluntary workshops. Nearly all wanted to learn how to use medicines more effectively.

Using true-or-false and multiple-choice questions, we learned that:

- participants' overall knowledge improved significantly after the course
- 93% demonstrated new knowledge about residue avoidance strategies, and
- 87% knew the difference between off-label and on-label treatments with medicines.

To determine changes in action, Alves used follow-up surveys in 1994 and 1995, receiving 42% and 86% response rate in respective years. From these surveys, fully 75% of participants said they made at least one management change because of the workshop. The most common actions were:

- more attention to the label
- improved records
- better storage of medicines
- more caution about extra-label use
- new sites for injections, and
- ask the veterinarian more questions.

Alves and McEwen concluded that the actions would be positive steps for Ontario's food animals and producers.

With rare exceptions, someone at every workshop asked when are you government guys going to make this course mandatory like that pesticides course? The Grower Pesticide Safety Course requires mandatory completion of a workshop and an examination. Following successful completion, producers receive a certificate that allows them to buy and apply pesticides. Some did not want the expense and

time commitment of a certification process imposed upon them for livestock medicines use. However, by the end of a course, participants were recommending a medicines certification program to us.

During this time, government was looking for ways to cut red tape and reduce regulation. It was a time of restraint and downsizing the government service. Our focus was on delivering an effective workshop and not on mandatory certification. After four meeting seasons, and with dwindling requests for workshops, we put the livestock medicines courses on the shelf. After four seasons of piloting workshops, our data showed that livestock medicines training could change attitude, knowledge and action.

One year later, Dairy Farmers of Ontario (DFO) decided that training and certification in the safe use and handling of livestock medicines would be a very useful component of their milk quality initiatives. Recognizing that all livestock commodity groups needed to agree to a coordinated scheme, DFO called livestock industry representatives together. The result was the Livestock Medicines Certification Committee and agreement to proceed with an industry-led certification plan. More about this appears later in the paper.

| Top of Page |

Swine medicines courses 1998-1999

Concurrent with a pilot project for pork quality assurance, OMAF and Ontario Pork launched a species-specific swine medicines course. Modeled after the original Livestock Medicines Manual, a Swine Medicines Manual and course materials were written for teaching and reference purposes. The swine manual contained only pig examples and included new or expanded sections about calculating dosages for feed, water and injectable medications. In addition, 22 private veterinary practitioners were recruited as teachers, trained in adult education techniques, and schooled in the core curriculum. The agenda, teaching objectives and methods were very similar to that outlined above for livestock medicines courses. A notable exception was the open-book examination at the end of the one-day workshop.

Nearly 1250 pig producers received training and examinations by the end of the first meeting season. Three participants failed the 21-question examination that required 60% for a passing grade for certification. Unlike the livestock medicines courses, the swine courses did not include a pre- and post-course questionnaire. However, an evaluation form asked what participants planned to change as a result of taking the course. Fully 80% planned to make one or more changes, including:

- needling techniques, storing sharps (32%)
- drug dosage, withdrawal times, label directions (20%)
- storing products, dating open bottles (19%)
- record keeping and inventory control (17%), and
- other changes (12%).

The next step was to determine what course participants actually did on their hog farms and to compare their actions to producers who had not taken the course.

| Top of Page |

Swine medicines audit 1999

During the summer of 1999, we randomly selected 100 hog producers located in southwestern Ontario for a swine medicines farm audit. The survey focused on the use, storage and disposal of swine medications. Most surveys were conducted on the farm. However, some were done by telephone interview.

The study had three objectives:

- to identify current drug use protocols
- to gather information to improve the current swine medicines course, and
- to determine what information taught in the course is difficult to apply on the farm.

The questions covered several topic areas:

- self-assessment of use, storage and disposal practices
- storage location and use of refrigerators
- who makes treatment decisions
- veterinary consultation on protocols
- information sources
- injection practices - needles choices, locations, cleaning equipment, and volume injected
- ration medications - which ones, with what, concentration, checking mixing,
- residue avoidance practices - barbecue pigs, identification, mixing of products in syringes, withdrawal practices
- work place safety, and
- education and training.

Fifty-three percent of those surveyed had taken the swine medicines course, and 78% of this group reported making some changes in practices after the course. The 78% taking action compares very favourably with the 80% commitment to action from the post-course evaluations. It also is similar to the 75% found by Alves and McEwen with the livestock medicines course participants a few years earlier. Apparently, 75% of workshop participants found something useful or easy to adopt after taking the course.

Table 1 shows a comparison of significant differences in practices between producers who took the swine medicines course and those who did not. Using the chi-square test for association, we found those who took the swine medicines course more likely to:

· judge their use, storage or disposal practices as needing improvement ($p=0.10$),
· have their veterinarian review their use of water, feed, or injectable medications ($p<0.05$),
· record the date-of-opening on bottles of injectable medicines ($p<0.05$),
· use a sharps disposal container ($p<0.05$), and
· use a longer (1.5-inch) needle for intramuscular injections in sows ($p<0.05$).

There was no association between self-assessment of on-farm practices and actual practices. Producers reviewed the use of injectable, feed or water medications with their veterinarian on greater than one-half of the farms. Writing the date on a bottle when it is opened, a new and specific concept taught in the course, was adopted by 24% of course participants. Likewise, the use of a sharps container found greater adoption (87%) by course participants. Evidently, participants appreciated the immediate benefits of a sharps container much more than writing a date on a medicine bottle.

Table 1. Comparison of significant differences in practices between producers who took the swine medicines course and those who did not. All figures are percents.

Practice	All Replies	Took Course	No Course
Self-assessment - needs improvement	17	23	11
Veterinary review - injectable medications	60	71	48
Veterinary review - feed medications	60	69	48
Veterinary review - water medications	80	93	64
Write date-opened on bottle of injectable	15	23	4
Use sharps container	66	87	40
Use 1.5 inch needle - IM injections - sows	63	79	41

Table 2 shows the frequency of some practices with no significant differences between producers who took a swine medicines workshop and those who did not take the course.

The most commonly used injectable antibiotic was penicillin and fully 70% of course participants and non-participants reported using a dose greater than the label dose. About half those surveyed mix injectable products together in a bottle or syringe. Nonetheless, there was no significant difference between the groups when considering the appropriateness of their use of their most common injectable antibiotic. Most producers injected greater than the label dose for penicillin. This confirms the findings of D.C. Plumb that the label dose is rarely used today.

Producers received most of their information about medicine use from their veterinarian (70%) or from the label or Compendium of Veterinary Pharmaceutical Products (44%). The owner made decisions about what medications to use in 83% of the operations, the manager or employee in 14%, and the veterinarian alone in 3%.

The use of refrigerators to store medicines is common (>80%) for unopened and opened injectables. However, before and after opening injectables, 8% to 16%, respectively, do not use a refrigerator for storage purposes. About 74% used refrigerators located in the barn and the remainder used one in the house. Rarely, we found non-operable refrigerators used as storage cupboards. The majority wash equipment in some fashion (81%). However, the use of a disinfectant (29%) is not common.

Table 2. Frequency of practices with no significant difference between producers taking a swine medicines course and not taking the course (all figures are percents).

Practice	All Replies	Took Course	No Course
Self-assessment of practices - good	83	77	89
Most common injectable - penicillin	77	78	75
Penicillin - dose greater than label dose	71	73	67
Appropriate use of injectable	46	52	40
Mix injectable medicines together	47	51	43
Drug use information from veterinarian	68	73	63
Who decides on medicines			
- owner	83	83	87
- employee	14	17	10
- veterinarian	3	4	3
Storage of injectables - before opening			
- all in refrigerator	71	70	71
- some in refrigerator	21	24	18
- none in refrigerator	8	6	11
Storage of injectables - after opening			
- all in refrigerator	71	70	72
- some in refrigerator	13	18	7
- none in refrigerator	16	12	22
Cleaning syringes and needles			
- wash in some fashion	81	76	86
- use a disinfectant	39	42	34
Identifying treated pigs - nursery			
- mark with or without records	67	70	64
- use sick pen to isolate	13	12	12
- do not identify	20	18	24
Identifying treated pigs - grower/finisher			
- mark with or without records	71	78	66
- use sick pen to isolate	20	15	23
- do not identify	9	7	11
Mixing medicated feeds			
- don't mix any	25	24	27
- sequence and flush system	47	53	36
- separate prep or storage systems	47	42	55

As some producers pointed out, dust in pig barns destroys refrigerators very quickly. For those without an office or dust-free alternative, the primary or second refrigerator in the home was chosen as a practical solution. The trend by course participants and non-participants appears to be not to refrigerate injectable

products after opening the bottles. Teachers stressed the use of refrigeration as a means to reduce bacterial growth in opened and potentially contaminated injectables. Evidently, producers do not share the concern or find room temperature storage locations more convenient.

For the most part, once rinsed, producers placed syringes in cupboards, sealed containers or refrigerators until the next use. Although not common, a few producers simply stuck the needle through the stopper of the vial as a means of storage. Some respondents avoided disinfectants because they knew residues in syringes could harm modified live virus vaccines. Either the reasons for proper cleaning strategies are unconvincing, the risk of not doing it is low, or the means to do so are inconvenient or unavailable.

Of those with nursery pigs, 95% medicated the nursery ration and 60% did not know the level of drug in the ration. The most common nursery ration medications were Mecadox or Carbadox (56%) and ASP-250 (20%). Of those with grower/finisher pigs, 62% fed medicated rations and 29% did not know the dosage level. The most common medications were tylosin (74%) and tetracycline (7%). For those knowing the concentration of medication mixed in their feeds, we found only a few not using the label directions. (The concentrations were less than recommended.)

The frequency of not knowing the concentration of medication in nursery rations reflects the common practice of purchasing nursery feeds. Apparently for many, there is no great need to know or risk from not knowing. The same may be true for those following instructions for medicating grower / finisher rations. They follow the mixing directions as instructed and trust in feed company or label recommendations. We found nothing special about the inability to recite the concentrations and expect one would find the same result when polling the users of common pain relievers about their total daily dose of active ingredient.

Of those feeding medicated feeds, 47% use the sequence and flush technique to avoid contaminating other feeds and 47% use separate feed preparation or storage systems.

With regard to identifying treated pigs, about 67% mark their pigs (and may or may not keep paper records). Fully, 13% separate treated pigs into sick pens in the nursery and 20% in grower/finisher barns. Nearly 20 % (nursery) and 9% (grower/finisher) do not identify sick pigs, relying on their memory and recognition.

Although course instructors stressed the proper identification of treated individuals or groups of animals, the survey data did not reveal any impact of the effort. The frequency of marking or separating nursery pigs under treatment (80%) is remarkable. Certainly, the risk of residues in these piglets 4-months hence would be minimal. However, the practice may be more for management reasons other than residue avoidance. Also notable, is the increased frequency of using marking or separation when treating grower / finisher pigs. The practice is practical and has immediate benefit for residue avoidance. These management practices appear to be routine regardless of course participation.

Teachers also described adequate record keeping and provided forms to do so. The usefulness of written treatment protocols was the primary focus of the course message. From this survey, we were unsuccessful at finding new or more intensive record keeping systems by course participants. Although not the most popular choice, post-course evaluations certainly showed producers had intentions to improve record keeping and inventory control. Record keeping is always a hard sell, and forced adoption of intrusive systems without immediate benefit are probably doomed to failure (Hardaker, JB). Evidently, producers believe what they are doing to be adequate for their purposes.

| Top of Page |

Livestock Medicines Certification Committee - towards 2003

As mentioned above, a coalition of livestock and poultry organizations began discussions in 1996 leading to the formation of the Livestock Medicines Certification Committee (LMCC) in November 1998 (MacNaughton, G.). The vision of LMCC is to foster the safe use and handling of livestock medicines in Ontario. The LMCC aims to promote and provide the means to assure training and on-farm implementation for safe use of livestock medicines. LMCC's Livestock Medicines Certification Program will require livestock and poultry producers to hold a valid Livestock Medicines Certificate in order to purchase over-the-counter animal and poultry medicines from licensed livestock medicines outlets in Ontario. Member organizations, Agriculture and Agri-Food Canada, and OMAF are funding the initiative.

Course development, delivery and administration, teacher and producer training, and funding are only a few of the core activities of LMCC. At the outset, LMCC recognized the need to develop practical materials for on-farm use, to develop on-farm validation processes and to foster an audit process as essential components of their initiative. The core curriculum planned for the LMCC program is essentially similar to previous livestock medicines courses.

The members of the coalition also recognize the importance of producer-led initiatives to the success of food safety programs. Two other initiatives, the Environmental Farm Plan and the Grower Pesticide Safety Course, have achieved success because farm organizations and government shared in development and delivery. Furthermore, leadership and support from the rural community assured producer participation.

The Committee targeted January 2000 for the introduction of the certification program across Ontario and January 2003 as the date for mandatory certification. The program compliments on-farm quality assurance programs already underway or in development.

| Top of Page |

Discussion and conclusions

Ontario consumers have access to one of the world's safest supplies of food. Reports from the Canadian Food Inspection Agency and provincial regulatory agencies confirm that contamination of meat or milk with unacceptable levels of residues is a rare event. However, the production of food is under increasing scrutiny by consumers. Indeed, producer organizations recognize the need for formal and validated on-farm safe-use and handling practices for medicines to assure access to local and international markets. Most recently, producer organizations are considering their use and handling of antimicrobials in relation to antimicrobial resistance and human and animal health.

On-farm antimicrobial resistance (AMR) programs could benefit from producer participation in livestock medicines courses. Apparent failure of antibiotic therapy often leads to requests for better and stronger antibiotics by producers. However, the failure may be related to inappropriate injection techniques, storage or handling that compromised the efficacy of the product. These matters are the focus of the workshops. Similarly, the workshops teach practical ways to address food safety, product quality, animal welfare, and human safety issues. More emphasis could be placed on AMR issues.

Readers may be alarmed by the results of the swine medicines audit, considering the frequency of some practices inappropriate or inexcusable, concluding that too many producers know not what they do. We ask, how could they know? Until recently, formal training was not provided to the handlers of livestock medicines in Ontario. They were self-taught by reading labels, the farm press, or instructed by their feed salesperson or veterinarian. Clearly, efforts by swine producers and their veterinarians resulted in positive improvements as shown by the swine medicines audit and the workshops.

While some livestock medicines practices on farms may be technically wrong, they are not very expensive mistakes and seldom result in any penalty that a producer can see or feel. Overdosing penicillin without an appreciation for the effect on withdrawal times is a very common mistake on pig farms. However, the overdosing is often in sows immediately after farrowing or in nursery pigs on farms not shipping barbecue pigs. Therefore, the real risk of residues resulting from these behaviours is slight and borne out by surveillance data at slaughter. These data did not reveal any similar risk assessments for AMR.

Human behaviour is difficult to change, especially without a stick or carrot. Experts can recommend storing open injectables in a refrigerator, identifying treated pigs, keeping records, proper cleaning and storage techniques for equipment, or not mixing injectables together for many valid reasons. However, producers will not change practices that exert undue pressure on their workplace, family values, available labour or perceived benefits. The innovations must be socially acceptable without much disruption in a producer's farm lifestyle (Frank, B.R.). Failure to stimulate adoption may have little to do with teaching abilities or teaching technique. Extension personnel need to recognize this fact when evaluating the success of programs to prevent residues or antimircrobial resistance.

With the livestock and swine medicines courses, we showed that we could build an effective workshop, that producers will attend, listen, change attitude, opinion, knowledge, or action and even pass a test.

However, producers are not likely to implement innovations after taking a four-hour workshop. Extension education is a matter of constantly reinforcing and repeating a message until it starts to sink in. It is not a job for the weak of heart, the inexperienced or those looking for short-term gains.

Producers using good management practices for the safe use and handling of livestock medicines certainly enhance the image of animal agriculture and are a credit to the farming profession. The audit revealed opportunities to broaden this professional image.

During our on-farm interviews, producers showed a genuine interest in finding ways to improve their practices. We encourage the rapid adoption of an on-farm audit system including a national reference standard (Dubuc, M). One-on-one contact during the validation process should accelerate adoption of key practices. New AMR surveillance could monitor on-farm changes.

At our post-season review, veterinary practitioners reported the teaching experience to be extremely rewarding. Preparation for teaching prompted critical appraisal of their practices and adjustments to meet the objectives for safe handling of livestock medicines. Similarly, producers confirmed the value of having veterinarians as the teachers.

We gratefully acknowledge and thank the swine producers for their participation.

| Top of Page |

References

Alves, D., S. McEwen. (March 1996) Teaching Livestock Medicines: Highlights: Agri-food Research in Ontario.

Dubuc, M*., V. McEachern. (September 1999)Report of the On-Farm Food Safety Sub-Committee, Federal Provincial, Territorial Agri-Food Inspection Committee Status Report, *MAPAQ-Quebec.

Frank, B.R. (1997) Adoption of Innovations in the North Queensland Beef Industry. 3. Implications for Extension Management. Agriculture Systems. 55 (3): 347-358;
ISSN: 0308-521X

Hardaker, J.B., J.R. Anderson (December 1981). Why Farm Recording Systems are Doomed to Failure. Rev. Marketing and Agric. Econ. 49 (3), 199-202.

Livestock Medicines Manual, Second Edition (1994). Ontario Ministry of Agriculture and Food, Fergus, ON. ISBN 0-7778-3541-X

MacNaughton, G. (November 1998). Livestock Medicines Certification Program, Dairy Farmers of Ontario, Mississaugua, ON. Personal communication.

Plumb, D.C., Veterinary Drug Handbook, Third Edition: p492, Iowa State University Press, Ames, IA, USA.

Swine Medicines Manual (1999), Ontario Ministry of Agriculture and Food, Fergus, ON. (In Press)

| Top of Page |

For more information:
Toll Free: 1-877-424-1300
Local: (519) 826-4047
Email: ag.info@omaf.gov.on.ca

| Livestock Home Page |

| Central Site | Feedback | Search | Site Map | Français|

Ontario

This site is maintained by the Government of Ontario, Canada.

This information is provided as a public service, but we cannot guarantee that the information is current or accurate.
Readers should verify the information before acting on it.

Feedback and technical inquiries to: livestock@omaf.gov.on.ca
© Copyright 2003 Queen's Printer for Ontario
Last Updated: July 24, 2003